

A NEW CRAWFISH OF THE GENUS *HOBBSSEUS* FROM
NORTHEAST MISSISSIPPI, WITH NOTES ON THE ORIGIN
OF THE GENUS (DECAPODA, CAMBARIDAE)

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The genus *Hobbseus* comprises a small group of species generally associated with small semi-permanent or shallow bodies of water in eastern Mississippi and western Alabama. The first members were described as *Cambarus cristatus* (Hobbs, 1955). The genus was erected by Fitzpatrick and Payne (1968) to receive the four known species and only *H. attenuatus* Black (1969) has been described subsequently. The species here treated was discovered in the upper reaches of the Tombigbee River drainage and represents the northernmost populations of the genus.

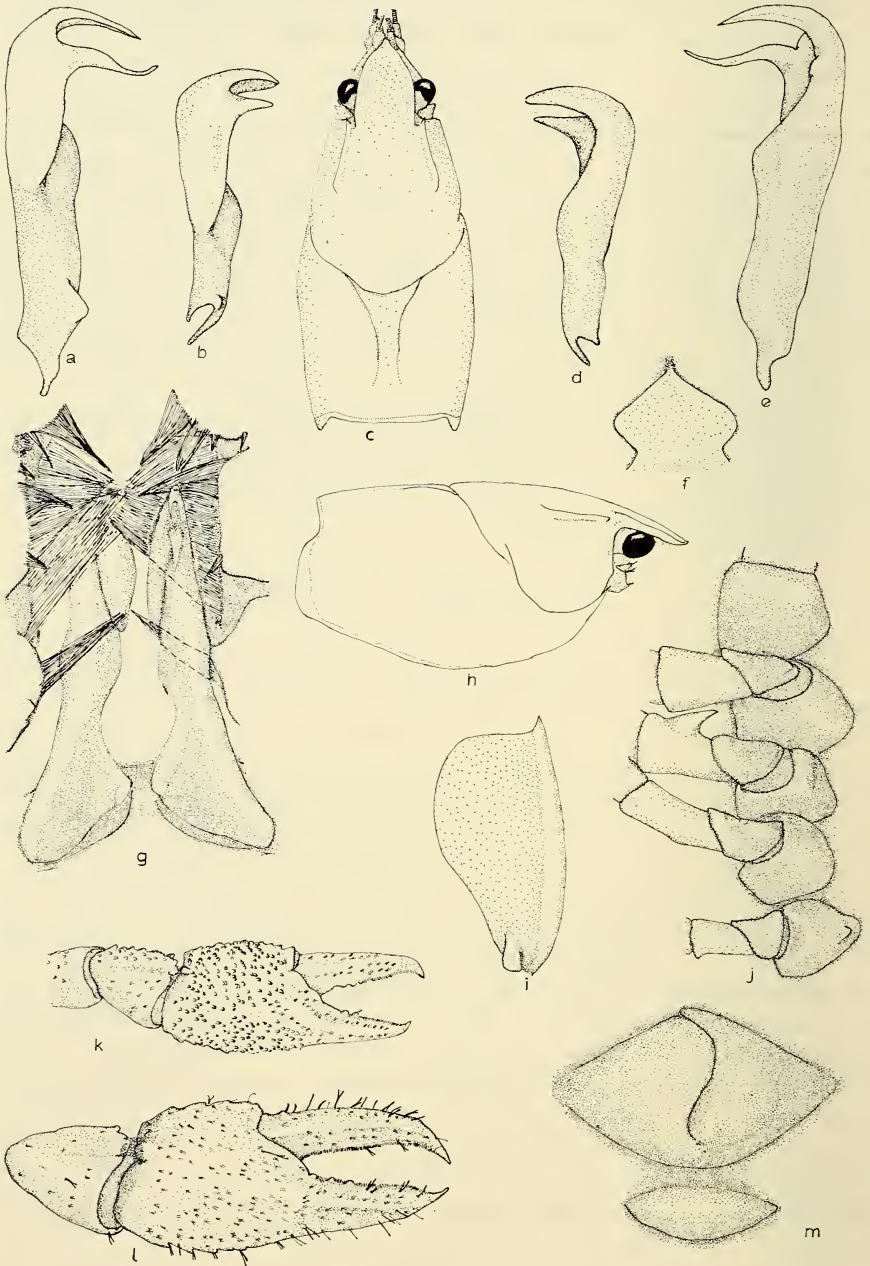
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Hobbseus petilus, new species

Fig. 1

Diagnosis.—Body and eyes pigmented. Rostrum spatulate, without marginal spines; acumen reduced. Areola 29.7 to 36.3 (avg. 33.1) percent of entire length of carapace and 4.07 to 5.56 (avg. 4.58) times longer than wide, with 2 to 3 punctations in narrowest part. Cervical spines absent. Postorbital ridges terminating cephalically in small spines or tubercles. Brachio-stegal spine obsolete. Antennal scale broadest distal to midlength. Ischia of only third pereopods of male with hooks; no bosses on coxae of pereopods but fifth with conspicuous tubercle on ventromesial margin. First pleopods of male symmetrical, terminating distally in 2 parts, both directed at angle of approximately 90° to main axis of shaft of pleopod: central projection corneous with acute tip; mesial process longer than central projection, delicate, tapering and curving proximally in middle third, recurving in distal third; prominent eminence on caudolateral margin at base of central projection. Tips of pleopods hooded by dense mat of setae arising from ventrolateral portions of sternum. Annulus ventralis movable with subcircular median elevation (ventrally) bisected by deep sinuous sinus arising midcephalically and terminating just before reaching posterior margin. Hand hirsute and, in first form male, covered with numerous small squamous tubercles.

Holotypic male, Form I.—Cephalothorax (Fig. 1c, h) broadly ovate, compressed laterally, deeper than wide at level of caudodorsal margin



of cervical groove (9.3, 7.5 mm, respectively). Abdomen shorter than carapace (17.7, 18.1 mm) and narrower (7.0, 7.5 mm). Areola 5.8 times longer than wide with two rows of punctations flanking inner margins at narrowest part, constituting 32.0 percent of entire length of carapace. Rostrum slightly depressed anteriorly, only weakly excavate dorsally, with scattered setiferous punctations and unthickened elevated margins, latter slightly convergent in distal half resulting in poorly delimited acumen. Subrostral ridge weak but visible in dorsal aspect to level of antennal scale. Postorbital ridge conspicuous, grooved dorsolaterally and terminating cephalically in small spines. Suborbital angle obtuse. Branchiostegal spine obsolete. Cervical spine absent; entire carapace with relatively deep setiferous punctations gradually replaced by squamous tubercles in extreme cephaloventral portions.

Cephalic lobe of epistome subcordiform, nearly planar with scarcely elevated margins and cephalomedian shallow groove; no fovea in main body. Antenules of usual form with well-developed spine near ventromesial margin of basal article. Antennae extending caudally to posterior margin of first abdominal tergite; antennal scale (Fig. 1i) 1.6 times longer than wide, widest distal to midlength, lateral part scarcely thicker than lamellar area but terminating in strong spine reaching midlength of ultimate podomere of antennal peduncle.

Cephalic section of telson with 2 spines in each caudolateral corner.

Chela (Fig. 1k) depressed, subovate in cross section. Upper surface covered with numerous irregular rows of small tubercles, many of which setiferous; inner marginal row of 12 on palm. Both fingers with submedian longitudinal ridge flanked by setiferous punctations and scattered setiferous punctations lateral to ridges. Opposable margin of immovable finger with two tubercles in basal half and crowded minute denticles along distal half. Opposable margin of dactyl with 2 tubercles (smaller than those on fixed finger) in basal half, weak excision delimiting basal fourth, and crowded minute denticles along distal half. Lateral margin of immovable finger slightly keeled; mesial surface of dactyl devoid of ornamentation.

Carpus of cheliped slightly longer than wide; dorsal surface with shallow oblique furrow, with widely scattered setiferous punctations laterally

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Fig. 1. *Hobbseus petilus* (all holotype except b, d, l, m). a, Mesial view of first pleopod; b, Mesial view of first pleopod of morphotype; c, Dorsal view of carapace; d, Lateral view of first pleopod of morphotype; e, Lateral view of first pleopod; f, Epistome; g, Caudal (ventral) view of first pleopods (some setation removed on left side); h, Lateral view of carapace; i, Antennal scale; j, Proximal podomeres of right pereiopods; k, Distal podomeres of cheliped; l, Distal podomeres of cheliped of allotype; m, Annulus ventralis of allotype.

and about 7 irregular rows of small tubercles medially; lower mesiodistal surface near mesiodistal margin with strong acute spine. Merus with 2 irregular rows of 11 tubercles each dorsally; mesial ventral row of 16, 2 distalmost larger than rest; and 2 ventrolateral rows, inner of 7 and outer of 6; also with 2 spinose tubercles on ventrodistal margin. Ischium with row of 5 small, spiniform tubercles along distal $\frac{2}{3}$ of mesial margin.

Hooks on ischia of third pereopods only (Fig. 1j); hooks simple and over-reaching basioischial articulation. Coxae of all pereopods lacking bosses, with only dense tufts of setae arising from mesial margins; coxa of fifth pereopod with spur-like mesioventral extrusion of posterior margin.

Sternum between third through fifth pereopods deeply excavate and with dense fringe of setae arising from lateral margins, setae obscuring distal half of first pleopods when latter held parallel to body.

First pleopods (Figs. 1a, e, g) as described in "Diagnosis"; central projection corneous.

Allotypic female.—Differing from holotype in following respects: areola with additional irregular row of punctations medially; areola proportionally narrower. Chela (Fig. 1l) quite hirsute, with many setiferous punctations and few tubercles; only 5 tubercles along inner margin of palm; outer margin of palmar region serrate. Lateral margin of fixed finger more compressed; opposable margins of both fingers with crowded minute denticles along most of length and tubercles only on fixed finger; prominent tubercles near base of mesial margin of dactyl. Carpus of cheliped lacking tubercles and oblique furrow not nearly so deep as in holotype.

Annulus ventralis (Fig. 1m) movable, subovoid in outline, highest (ventrally) medially; nearly unornamented, with deep sinus arising near center of cephalic margin and running sinuously along mid-line nearly to caudal margin.

Morphotypic male, Form II.—Differing from holotype in following respects: areola proportionally shorter and wider. Chela intermediate between holotype and allotype in degree of setation; tubercles restricted to region of inner margin, row of 6 on margin and irregular row of 3 medial to it. Basal third of immovable finger with 4 closely-set tubercles and fifth tubercle at about midlength; submedian longitudinal ridges of both fingers less prominent and lateral margin of fixed finger scarcely compressed. Carpus with tubercles and sparse scattering of setae. Ischia of third pereopods lacking hooks. First pleopod (Figs. 1b, d) with terminal elements blunt, neither corneous; central projection longer than mesial process; no eminence at base of central projection.

Type-locality.—Small, unnamed tributary of Patch Creek (Tombigbee River drainage), 11.8 km E of U.S. Highway 45 in Saltillo, on State Route 363. There the sluggish, shallow (less than 30 cm) stream, emerging from an open pasture, ran through a relatively dense growth of sedges,

Table 1. Measurements of type-specimens of *Hobbseus petilus* (in mm).

	Holotype	Allotype	Morphotype
Carapace			
length	18.1	17.8	13.6
width	7.5	7.8	6.1
height	9.3	8.7	7.0
Areola			
length	5.8	6.1	4.2
width	1.0	1.0	0.8
Antennal scale			
length	3.1	2.9	2.9
width	2.0	1.8	1.5
Rostrum			
length	4.6	4.7	3.6
width	3.3	3.4	2.7
Chela			
length of inner margin of palm	5.6	2.6	2.9
width	5.4	3.6	2.8
total length	11.7	7.0	6.2
dactyl length	6.4	4.1	3.8

in which the crawfish were hiding; the bottom was silty. No other crawfish was in the watercourse in this area.

Disposition of types.—The holotypic male, Form I, the allotypic female, and the morphotypic male, Form II, are in the National Museum of Natural History (Smithsonian Institution) as numbers 147673, 147674, and 147675, respectively. Paratypes are in the collections of NMNH (2♂ I, 3♂ II, 5♀), Dr. Joe B. Black (1♂ I, 2♀♀), and the author (3♂ I, 3♂ II, 3♂ j, 3♀ j).

Range and specimens examined.—Specimens were examined from the following localities, all in Mississippi: ITAWAMBA COUNTY: Bull Mountain Creek, 90 m from Monroe County line on St. Rte. 25 (1♂ j), 1 Apr. 1966, Marcella Payne, James F. Payne, Shih-ming Chien, coll.; MONROE COUNTY: 5.6 km S of St. Rte. 382 on U.S. Hwy. 45W (1♂ II, 1♀, 1♀ j), 18 Mar. 1966, Laurence E. Fleming, S. M. C., J. F. F., Jr., coll.; Slough at jct. St. Rtes. 8 and 25 (1♂ II, 1♀, 2♂ j, 2♀ j), M. P., J. F. P. and S. M. C., coll.; LEE COUNTY: 11.8 km E of Saltillo on St. Rte. 363 (2♂♂ I, 3♂♂ II, 5♀♀), 27 Apr. 1967, J. F. P. and L. E. F., coll.; roadside ditch, 10.0 km N of Tupelo (jct. U.S. Hwy. 78) on U.S. Hwy. 45 (2♀♀), J. F. P. and L. E. F., coll.; type locality (5♂♂ I, 2♂♂ II, 11♀♀), J. F. F., Jr. and Barbara A. Laning, coll.

Variations.—Beyond the sexual differences and the degrees and nature of variation evident in the description of the types, little other variation was observed. The most conspicuous seen was in the organization of the punctations in the areola. In only 14.3% of the specimens examined are there two rows of punctations; in another 28.6% there is a median row. By far most common (57.1%) is a condition in which the central row is absent in the middle third of the areola length but present at both ends. All three combinations were found in the topotypic population. Numbers of tubercles are quite varied. The counts given for the holotype pereopod are for the right member, but in the left member, there are 13 and 15 tubercles on the dorsum of the merus, 14 on the ventromesial margin, and 6 and 5 on the ventrolateral margin. The mesial margin of the ischium has 7 tubercles.

Color notes.—*Hobbseus petilus* has a color pattern frequently found in small crawfish occupying shallow, semi-permanent waters provided with much emergent vegetation. The base color is blue-black and a prominent tan band as wide as the rostrum and areola runs from the rostral tip to the cephalic margin of the telson. The ventrolateral parts of the carapace are mottled with tan and a vaguely defined narrow tan line runs lengthwise about midway up the carapace. The terga of the abdomen are lightly mottled and the pleura more so; a well-defined narrow light tan stripe delimits all the pleura from the terga. The telson and uropods are mottled and the outer margins of the latter are marked with a tan stripe. The pereopods are banded, except for the carpus, merus and dactyl of the cheliped. The carpus and palm are basically tan, but punctations and tubercles are blue-black. Both fingers are concolorous very dark tan with the corneous tips appearing light in contrast. Beneath, including pereopods, the animal is uniformly creamy to white. The colors seem to lose intensity as the animal progresses from the molt, but they are still vivid at least four months later in some specimens.

Associates.—*H. petilus* has been collected in association with the following crawfish: *Cambarus (Depressicambarus) striatus* Hay, 1902; *C. (Lacunicambarus)* sp.; *Procambarus (Girardiella) hagenianus vesticeps* Fitzpatrick, 1977; *P. (Ortmannicus) acutus acutus* (Girard, 1852); *P. (O.) hayi* (Faxon, 1884); *P. (O.) hybus* Hobbs and Walton, 1957; *P. (O.)* sp.; and two undescribed species of *Orconectes*. Full citation of those species treated by Hobbs in his checklist (1974) is not given; this work should be consulted if full reference is desired.

Relationships.—This new species is clearly closely related to the several species of the genus *Hobbseus*. It differs from *H. orconectoides* Fitzpatrick and Payne and *H. valleculus* (Fitzpatrick) in the degree to which the terminal elements are bent—nearly straight in the former and at nearly 180° in the latter. Only in *H. attenuatus* Black is the central projection bent

at 90° ; in *H. cristatus* (Hobbs) it is less than 90° and greater in *H. prominens* (Hobbs). *H. petilus* is separable from *attenuatus* by its undulating mesial process, the base of which is turned about 110° , while in the latter species it is scarcely greater than 90° . *H. petilus* differs from all known species of the genus in the eminence at the base of the central projection.

This latter eminence, although not as prominent, is located in nearly the same place as is the caudal knob in *Cambarus* (*Veticambarus*) *pristinus* Hobbs. As in all *Hobbseus*, there is no notch in the apex of the central projection and the mesial process is markedly the longer element. Likewise, the coxa of the fourth pereopod of the male lacks the boss present in *Cambarus*. Yet in his discussion of the origins of the genus, Hobbs (1969: 120-122) notes that many of the characteristics of the genus represent adaptations to the particular environment in which they exist: "vegetation-choked, littoral portions of a sluggish stream in which the water level fluctuated." Thus, although clearly distinct from *Cambarus*, the members of *Hobbseus* may be closer to the former than proposed by Hobbs in his discussion (*ibid.*, esp. Fig. 4). He based his primitive orconectid pleopod on *O. australis australis* Rhoades, but in this species the caudal process is so rudimentary that it stretches credulity to suppose that such a prominent feature as the eminence of *petilus* could be derived as a secondary development from it. In female *Hobbseus* the annulus ventralis is freely movable, in contrast with those of *Cambarus* and *Fallicambarus* which are only slightly movable, at best. In primitive *Orconectes* the annulus is freely movable. This would be far more significant were it not for the fact that in members of the genus *Procambarus*, generally accepted as closest to the ancestral stock, the annulus is likewise freely movable.

Evidences from this new species strengthen the belief that *Hobbseus* arose from the cambaroid line proposed by Hobbs (*ibid.*; p. 119) rather than the orconectoid line. This is not a marked deviation from the lineages suggested by Hobbs; indeed, it would remove the ancestor only one step before that proposed. The greatest difference from Hobbs' thesis would be that the genera *Cambarus*, *Hobbseus* and *Orconectes* would become contemporaneous, or nearly so, in their emergence from the archiorconectoid (= Adorconectoid stock) line.

Zoogeographically, this is not incompatible with known facts. The general distribution phenomena are well-discussed and well-analyzed by Hobbs (1969). In the area occupied by *Hobbseus*, *Cambarus* is represented only by *C. (D.) striatus* and members of the ubiquitous species complex currently recognized as *C. (Lacunicambarus) diogenes* subsp. All of the *Orconectes* of the area belong to the very advanced Virilis Section. Basically, the other associates are mostly members of the subgenus *Ortmannicus* of *Procambarus*. The refugium of *C. (V.) pristinus*, although now isolated

from *Hobbseus* in the Tennessee drainage, would not have been far removed from the home of *Hobbseus* as the lands south of the Mississippi Embayment became open to population and before the upper and lower reaches of the Tennessee River became united in northern Alabama. Indeed, the region now occupied by *Hobbseus* was, at the time of the emergence of the genera, zoogeographically closer to the proto-*pristinus* stock than to the proto-*australis* stock. None of this is incompatible with the excellent zoogeographic analysis of Hobbs (1969:126-128, et seq.).

Etymology.—The name is taken from the Latin *petilus*: thin, slender. It is an allusion to the slender, long mesial process characteristic of this species and the other members of the genus.

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